

REMARKS

Claims 30, 40, 43, 44 and 48 are amended to more particularly point out and distinctly claim that which the Applicants regards as the subject matter of their invention. Support for the amendments is found throughout the specification. Entry and reconsideration of the claims, as amended, are respectfully requested.

Amendment of claims

The amended claims 30, 40, 43, 44 and 48 are supported specifically in the specification and do not constitute new matter. Support for the amendment of the claims can be found throughout the specification. Support for the term "having a core compression" and "allowed to cure at room temperature to preserve the core compression" is found on page 12. Support for the term "semi-gelled polyurethane" is found on page 17. The amendment language that "said core is inserted into said semi-gelled polyurethane . . . the golf ball is removed" is supported on pages 18-26. The term that the "reactants are poured into a pair of mating mold halves" is supported on page 15. Support for the "benzene ring" amendment of the curatives is supported on pages 10-12. Support for the limitation of the diisocyanate to those "having a benzene group" is supported on page 12-13, and most specifically on page 13 lines 16-25 on page 13.

Rejection of the claims under 35 U.S.C. § 112

In paragraph 2 of the office action, claims 30-33, 36-41, and 43-47 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention. Claims 30, 40, 43 and 44 have been amended to more particularly point out what the applicants consider their invention. The amendment renders the rejection moot as the language that was the basis of the rejection has been replaced with language that more accurately describes the claimed invention. Applicants have removed the rejected language of "finished mold halves", "single molding operation", "formed completely in the same mold in a single molding operation cycle from liquid polyurethane reactants within a single mold", and "wherein said liquid polyurethane is poured into a pair of finished mold halves". The above terminology is supported inferentially throughout the specification. With respect to "finished mold halves" it is well understood that a golf ball must contain dimples and the specification is clear that this involves a one step operation and that there are no required additional processing steps and thus the mold halves must contain dimples to form the finished golf ball.

With respect to the language "single molding operation", "formed completely in the same mold in a single molding operation cycle from liquid polyurethane reactants within a single mold", and "wherein said liquid polyurethane is poured into a pair of finished mold halves" the specification is

clear that the core is introduced into the mold containing semi-gelled polyurethane and that no additional processing steps are required to achieve the final ball. One skilled in the art of polyurethane chemistry would know that the teachings of the specification state that the ball is produced in a "single molding operation" unlike the prior art that uses a half shell method and compression molding with high heat to introduce dimples. The half shell process of the prior art requires high heat and/or a long duration at elevated temperatures to form dimples and to provide sufficient green strength to remove the ball containing dimples on the cover to prevent damage that would render the ball unusable if handled improperly.

The language of the claims now is unarguably fully supported throughout the specification and one skilled in the art would be able to practice the claimed invention without further guidance. Reconsideration and removal of the rejection of claims 30-33, 36-41, and 43-47 under 35 U.S.C. § 112(1) are respectfully requested.

In paragraph 3 of the office action, claims 48-52 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention. Independent claim 48 and claims 47-52, which depend therefrom, are amended to produce sufficient guidance to one skilled in the art to produce the claimed invention. The amendment renders the rejection moot.

Claim 48 has been amended to limit the diisocyanate to those that comprise at least one benzene ring substituted with a reactive isocyanate group at the terminus. This structural description limits the diisocyanates claimed to cover the chemical species of TDI, TODI, MDI, XDI, m-TMXDI, NDI and PPDI in all their known positions such as ortho, para and meta on the substituted benzene ring and other homologs, all of which are combinations of benzene rings having reactive isocyanate groups.

The benzene ring and its linkages to a reactive isocyanate group has been extensively studied and is well understood by those skilled in the art of polyurethane chemistry reactions. The specification describes the effects of hindered and unhindered amines in different blend ratios reacting with a diisocyanate-polyol prepolymer having specific ratios (NCO% and Stoichiometric ratio of the curative to the prepolymer). The average polyurethane chemist should be able to apply the teaching in the specification to determine the correct ratios to achieve the claimed cure temperatures in a very short period with limited testing for any selected diisocyanate having a benzene ring. It is well known in the art that performing a cure test takes only a few minutes to set up and one skilled in the art would be able to run sufficient tests in a short period of time to achieve the desired results.

To determine whether undue experimentation is required, one looks to a the person of ordinary skill of the art in that filed. The Federal Circuit commented in Custom Accessories Inc. v. Jeffrey-Allen Indus., 807 F.2d 955, 1 USPQ 2d 1196, 1201 (Fed. Cir. 1986):

The person of ordinary skill is a hypothetical person who is presumed to be aware of all the pertinent prior art. The actual inventor's skill is not determinative. Factors that may be considered in determining level of skill include: type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field. Not all factors may be present in every case, and one or more of them may predominate.

The average skill in the art of a person working with polyurethane formulations in industry is either at a PhD level or under supervision of a PhD-educated chemist, and therefore one expects less specific direction to produce a combination having the claimed cure temperatures. One skilled in the art of polyurethane chemistry normally tests reactants to determine items like cure temperature, time and other effects on physical properties by using test protocols common and well known in the art.

While the chemical arts in general are usually considered to be unpredictable arts one skilled in the art of polyurethane chemistry would be well versed in the reaction of diisocyanates and polyols in different ratios using different curatives to determine cure temperature from the applicant's teachings provided in the specification. In PPG Indus. V. Guardian Indus. Corp., 75 F.3d 1558, 37 USPQ 2d 1618 (Fed. Cir. 1996), the Federal Circuit noted that the fact that some experimentation is necessary does not preclude enablement; what is required is that the amount of experimentation not be duly extensive. The inherent nature of the polyurethane systems disclosed in the specification are sufficient to enable one of ordinary skill to produce the claimed invention.

In paragraph 4 of the office action, claims 30-33, 36-41, and 43-47 stand rejected under 35 U.S.C. § 112 (2), as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims were rejected for the terminology "finished" when used in conjunction with "golf ball cover", "polyurethane cover", or "mold halves". The terms were used by the applicants to clearly indicate that the molding operation was continuous and did not allow for the discontinuous half shell process of the prior art. Claim 40 was rejected over the terminology of "liquid polyurethane prepolymer reactants" and liquid state.

Claims 30, 40, 43, and 44 have been amended to delete the objectionable language and amended to include terms specifically used in the body of the specification to more particularly point out and claim what the applicants consider their invention. Reconsideration and allowance of the claims are respectfully requested

In paragraph 5 of the office action, claims 30-33, 36-39, and 43-47 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors had possession of the invention at the time of filing. Claims 30-33, 36-39 and 43-47 have been rejected for including the language "liquid polyurethane" and "reaction product(s) of liquid polyurethane". Claims 30, 40, 43, and 44 have been amended to more particularly point out what the applicants consider their invention and the terms "liquid polyurethane" and "reaction product(s) of liquid polyurethane" have been

removed. Claims 30, 40, 43, and 44 have been amended to now include only terms specifically used in the body of the specification to more particularly point out and claim what the applicants consider their invention.

Reconsideration and allowance of the claim is respectfully requested.

In paragraph 6 of the office action, claims 30-33, 36-39, and 43-47 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make or use the invention. Claims 30-33, 36-39 and 43-47 have been rejected for including the language "liquid polyurethane" and "reaction product(s) of liquid polyurethane". Claims 30, 40, 43, and 44 have been amended to more particularly point out what the applicants consider their invention and the terms "liquid polyurethane" and "reaction product(s) of liquid polyurethane" have been removed. Claims 30, 40, 43, and 44 have been amended to more particularly point out what the applicants consider their invention. Claims 30, 40, 43, and 44 have been amended to include terms specifically used in the body of the specification to more particularly point out and claim what the applicants consider their invention. The applicants do not now claim liquid polyurethanes and therefore reconsideration and allowance of the claims are respectfully requested.

In paragraph 7 of the office action, claims 48-52 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not enabled to produce golf ball covers "using virtually any polyisocyanate". Independent claim 48 and claims 47-52, which depend therefrom, are amended to provide

sufficient guidance in the specification to one skilled in the art to produce the claimed invention. The amendment renders the rejection moot.

Claim 48 has been amended to limit the diisocyanate to those that comprise at least one benzene ring substituted with a reactive isocyanate group at the terminus. This structural description limits the diisocyanates claimed to cover the chemical species of TDI, TODI, MDI, XDI, m-TMXDI, NDI and PPDI in all their known positions such as ortho, para and meta on the substituted benzene ring and other homologs, all of which are combinations of benzene rings having reactive isocyanate groups. The benzene ring and its linkages to a reactive isocyanate group has been extensively studied and is well understood by those skilled in the art of polyurethane chemistry reactions.

The average skill in the art of a person working with polyurethane formulations in industry is either at a PhD level or under supervision of a PhD-educated chemist, and therefore one expects to need less specific directions to produce the claimed polyurethane cover. One skilled in the art of polyurethane chemistry would have more than sufficient guidance to produce the claimed invention by using the applicants' specification as a guide.

In paragraph 8 of the office action, claims 44-46 and 48-52 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which was not enabled to produce golf ball covers "using virtually any blend of differently reacting diamines". Applicants draw the examiner's attention that what is specifically claimed, a benzene ring that is substituted with two amine reactive groups. This is a narrow group of reactive amines and therefore one skilled in

the art which as previously discussed is a PhD chemist would know the small group of diamines claimed and would need no guidance beyond what is provided in the specification. Applicants concur with the examiner's position that one is provided guidance from page 11 of the specification sufficient to enable one skilled in the art to produce the invention. The claims and specification are not designed to be a production manual for competitors to learn exact processing conditions for every possible example but to provide guidance to those skilled in the art.

In paragraph 9 of the office action, claims 30, 31, 33, 36-40, and 44-51 stand rejected under 35 U.S.C. § 112 (1), as containing subject matter which is not enabled to produce golf ball covers "using virtually any ether glycol". The examiner is directed to the arguments as discussed above concerning that of diisocyanates and that the skill of one in the art would be provided sufficient guidance and have sufficient knowledge of chemistry to produce the polyurethane using virtually any ether glycol because the reaction between a polyol and an isocyanate are known and the terminology "ether glycol" thus is limited to only those chemicals having similar characteristics and thus no further guidance is needed to one skilled in the art beyond that provided in the specification.

In response to the reminder in paragraph 10 of the office action, all claims are commonly owned.

In paragraph 11 of the office action, claims 30-33, 36-41, and 43-52 stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over Kato et al.

(‘852) or GB 2301291, each in view of Wu (‘673) and Isaac (‘568) and Presswood (‘298). The examiner is correct that the Kato and GB references discuss two piece balls and thread wound three piece balls.

In paragraph 12 of the office action the examiner correctly states that the references of Kato and GB provide no guidance to the production or use of polyurethane covers on either a two-piece or three-piece thread wound golf ball. Wu discloses the use of a prepolymer and a slow reacting curative. A polymer’s properties are process dependent and certain polymer combinations must be produced by a specific process or the properties that result would not be desirable. Wu teaches the use of a slow reacting curative with the prepolymer for the specific purpose of processing as is taught on column 4, lines 37-45:

*The preferred process for making a molded golf ball cover in accordance with the present invention comprises **an initial curing step in an open mold** followed by a molding step wherein the core is placed into one of the mold cups. The mold is then closed and the urethane is allowed to cure. The molding step comprises an initial molding step wherein a **first mold having smooth-walled fixed-pin mold cups** is used followed by a final molding step wherein the smooth-surfaced golf ball product from the initial molding step is **subject to a second mold having mold cups with a negative dimple pattern which is used to overmold a dimple pattern onto the smooth-surfaced golf ball product.** (emphasis added)*

Wu teaching is clearly displayed from the above quote that the slow reactive curative in Wu is selected to allow for discontinuous processing. The teaching of Wu is contrary to the applicant’s claims which are clearly limited to a continuous production process that does not allow for further processing operations. Wu further teaches how its chemistry relates to its processing

required to produce a “complete” polyurethane golf ball suitable to be used by a golfer in column 5, lines 32-38:

*In the final molding step, **a compression mold is used to impart a dimple pattern upon the cover of the smooth-surfaced golf ball product.** In this final molding step, the **smooth-surfaced golf ball product is subjected to heat and pressure** such that any pinholes which are in the ball's cover are closed and such that the cover conforms to the dimple pattern of the mold halves. (emphasis added)*

The chemistry of WU is clearly tied to its processing conditions because a very slow cure is required or the second molding process to place dimples on the golf ball would not be possible. WU teaches away from the use of a faster reacting curative being blended with its slow reacting curative to produce a room temperature cure. One who used the teaching of WU would not be motivated or taught to add a second curative to increase the reaction rate since to do so in the WU system would not produce a desirable golf ball. Only hindsight reasoning and the teachings of the applicants' own specification would allow this combination. The use of the Applicant's own reference to provide the teaching to combine references is improper and thus the rejection is prima facie improper and must be removed.

Isaac teaches a polyurethane golf ball having prepolymers and blends of curing agents as suggested by the examiner, but only to produce covers through the half shell process. The teachings of polyurethanes are tied to their processing because as is well known in the art, a polymer's properties are process dependent. Changes in chemistry necessitate a change in processing. The teaching of Isaac is best summarized in the abstract:

*An improved process and resultant composition for covering golf balls with polyurethane is disclosed. Either the prepolymers or the curing agents are selected to **have different rates of reaction so that a partial cure can be made to form a ball half shell whereafter the half shell can be disposed about the golf ball core and finished cured.** (emphasis added)*

Isaac teaches away from the instant invention because it teaches a half shell method using compression molding to produce dimples and cure the polyurethane at high temperatures. Both Isaac and Wu teach the use of a combination of reactants that slow the reaction to the point that a second molding operation of compression molding can be performed to produce the dimples in a finished golf ball. The chemistry and processing steps related to the processing are claimed and these are not taught by the prior art. The prior art teaches away from the applicants' invention and therefore it is not proper to select individual components of a prior art's teaching and ignore that the fact that the combined teachings are contrary to that of the invention. Furthermore the hardness is not inherent with the teachings as suggested by the examiner because the instant invention's hardness is produced with a room temperature cure. If the teachings of the selected art combination were followed would not be fully cured to achieve the required hardness without a high temperature post cure.

In paragraph 13 of the office action the examiner acknowledges that Isaac fails to teach the suggested curative combination. The Presswood disclosure teaches a RIM process and provides no guidance to the chemistry required to produce a cast golf ball. The examiner suggests that Presswood

“further discloses the relative reactivities of the specified chain extenders”.

Presswood, however, is lacking in many respects. Presswood fails to teach or suggest the claimed polyurethane, the step of introducing a core into a cast polyurethane mixture and producing a complete golf ball in only one mold. There is no teaching or guidance to modify the golf ball polyurethane of the cited combinations with teachings of Presswood without using hindsight reasoning and the Applicants specification as a template. The combination is improper and thus the obviousness rejection should be removed because it fails to teach each every limitation of the claims.

In paragraph 14 of the office action the examiner purports that the above cited art in combination would have made the claimed invention obvious. Each of the above cited art is deficient for various reasons as discussed above. The cited combination fails to teach each and every limitation of the claims either singly or in combination.

The Federal Circuit held that “It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that *“[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”* See *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992).

The combination is improper because each of the above discussed cited art teaches away from the applicants invention. The applicants respectfully

request removal of the rejection in light of the improper combination of references.

In paragraph 15 the examiner states that the applicants have failed to argue how product by process claims process limitations patentably distinguish the product. The applicants have repeatedly discussed the inherent deficiencies of the prior art in previous responses and stated how the processes are critical to the performance and production of the ultimately produced golf ball. The cited art also discusses the relation of processing to the golf ball properties and that is why they require a compression molding step and heated post cure to achieve those properties. As one skilled in the art would know, a polymer's properties are processing dependent. Thus a polymer product with processing limitations would clearly produce a patentably distinguished product.

The cited art teaches polyurethane chemistry combinations that must be produced in a certain manner or the final polyurethane will have deficient properties. The heating and curing of the prior art polyurethane covers affects the physical properties of the core that shortens the golf ball's useful life before it's properties fade due to excessive heat exposure. Thus, Applicants' invention addresses a long felt need in the golf ball industry to produce a polyurethane cover having excellent properties while maintaining the core properties present in a thermoplastic ionomer ball which undergoes no post cure. Claims 30, 40, 43, and 44 have been amended to include the processing steps that effect the properties of the completed golf ball.

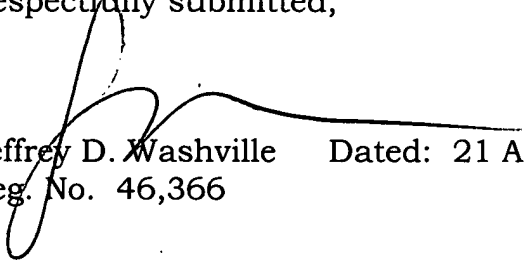
In light of the amendments, Applicants respectfully request reconsideration and removal of the rejection of claims 30-33, 36-41, and 43-52 under 35 U.S.C. § 103 (a).

Conclusion

In light of the prior art and amendments Applicants believe all claims as written and now amended in the instant invention are allowable.

Reconsideration and allowance are requested.

Respectfully submitted,


Jeffrey D. Washville Dated: 21 APR 03
Reg. No. 46,366

440 Commercial Street
Boston, MA 02109
Tel.: (617) 227-0700
FAX: (617) 723-4609

Certificate of Mailing

The undersigned hereby certifies that this paper along with any paper or document referred to therein as being attached or enclosed, is being deposited with the United States Postal Service via First Class Mail, Postage Prepaid, service under 37 C.F.R. §1.8, in an envelope addressed to the Assistant Commissioner for Patents, , Washington D.C. 20231- This 21st day of April.



Jeffrey D. Washville

MARKED UP CLAIMS

30. (Fifth amendment) A golf ball comprising:

(a) a core having a core compression; and

(b) a finished golf ball cover formed by casting having a Shore D hardness of 50D to 65D, wherein said cover is produced through a mixture of [being a polyurethane formed from the reaction products of:]

[a liquid polyurethane comprising:]

(1) a diisocyanate wherein said diisocyanate is selected from a group consisting of toluene diisocyanate , 4,4'-diphenylmethane diisocyanate, Isophorone diisocyanate and mixtures thereof;

(2) a polyol having a molecular weight of about 650-3000 wherein said polyol is an ether glycol; and,

(3) a curing agent consisting of:

(A) a first diamine dimethylthio-2,4-toluenediamine; and,

(B) a second diamine diethyl-2,4-toluenediamine

wherein said mixture [liquid polyurethane] is poured into a pair of mating [finished] mold halves , said mixture forms a semi-gelled polyurethane, wherein said core is inserted into said semi-gelled polyurethane, the mating mold halves are joined to form a golf ball, when the golf ball is removed [forming the finished] the golf ball [that] is allowed to cure at room temperature to preserve the core compression [in a single molding operation].

40. (Three amendments) A golf ball comprising:

a core having a core compression, comprising a center and thread layer wherein said core has a diameter from about 1.48" to about 1.62"; and,

a [finished] polyurethane cover having a Shore D hardness of 50D to 65D formed [completely in the same mold in a single molding operation cycle] from [liquid polyurethane prepolymer] a mixture of reactants poured into [within a [single] at least one pair of mating mold halves, wherein the mixture of reactants produce a semi-gelled polyurethane, wherein the core is introduced into at least one of the pair of mating mold halves containing the semi-gelled polyurethane, which after waiting approximately four minutes forms a golf ball that cures at room temperature to preserve the core compression, wherein the reactants [comprising] comprise:

(a) (1) a diisocyanate selected from the group consisting of toluene diisocyanate, 4,4'-diphenylmethane diisocyanate, Isophorone diisocyanate and mixtures thereof, and

(2) [a] an ether glycol polyol having a molecular weight of about 650-3000; and,

(b) a curing agent comprising:

(1) dimethylthio-2,4-toluenediamine; and,

(2) diethyl-2,4-toluenediamine.

43. (Fifth amendment) A golf ball comprising:

a center comprising 100 PPHR cis polybutadiene rubber, 20 PPHR zinc acrylate salt, 24.5 PPHR barium sulfate, 6 PPHR zinc oxide, 3 PPHR zinc stearate and 2.1 PPHR 1,1-di-(tert-butylperoxy)-3,3,5-trimethyl cyclohexane;

a thread layer winding comprised of polyisoprene rubber, wherein said thread layer forms a core having a core compression; and

a cast [finished] golf ball cover formed [in a single molding operation] from [liquid] reactants poured into mating mold halves, the cast golf ball cover when cured having a Shore D hardness of 50D to 65D wherein the reactants comprise [comprising the reaction product of a liquid polyurethane comprising] 100 PPHR of toluene diisocyanate and polyoxytetramethylene ether glycol that forms a prepolymer with an NCO content of about 5.5% to 8.0% by weight of said prepolymer, said prepolymer is further reacted with 13.2 PPHR of a curative comprising diethyl-2,4-toluenediamine and dimethylthio-2,4-toluenediamine at a 50:50 weight ratio and 2.3 PPHR pigment [so that the overall ball diameter is about 1.68" wherein said liquid polyurethane is] when the reactants are mixed and poured into a pair of mating [finished] mold halves, the reactants form a semi-gelled polyurethane in one of the pair of mold halves, wherein the core is inserted into the semi-gelled polyurethane the pair of mating mold halves are joined and engulf the core in the semi-gelled polyurethane;

when the mold halves are opened [forming the finished] a golf ball is removed and allowed to cure at room temperature to preserve the core compression.

44. (Thrice amended) A golf ball comprising:

(a) a core having a core compression; and

(b) a [finished golf ball] cover having a Shore D hardness of 50D to 65D, said cover being a polyurethane formed from [the reaction products of a liquid polyurethane in a single molding operation] a mixture of reactants comprising:

(1) a diisocyanate selected from the group consisting of toluene diisocyanate, 4,4'-diphenylmethane diisocyanate, Isophorone diisocyanate and mixtures thereof;

(2) a polyol having ether groups, wherein said polyol has a molecular weight of about 650-3000; and,

(3) a curing agent comprising:

(A) a first diamine substituted [toluene] benzene ring wherein said first diamine substituted [toluene] benzene ring has amine groups which are sterically or electronically hindered; and,

(B) a second diamine substituted [toluene] benzene ring having no interference with its amine group, wherein said first diamine substituted [toluene] benzene ring has greater hindrance of its amine group than said second diamine substituted benzene ring's [toluene diamine's] amine

group, wherein [said liquid polyurethane] the mixture of reactants is poured into a pair of mating [finished] mold halves, the reactants form a semi-gelled polyurethane into which the core is inserted, the mold halves are mated engulfing the core in the semi-gelled polyurethane, when the mold halves are separated [forming] the [finished] golf ball is complete and is capable of being cured at room temperature to preserve the core compression without reduced properties.

48. (Once amended) A golf ball comprising:

a core having a core compression;

a cover comprising a blend of:

(c) a polyurethane prepolymer comprising:

(1) a diisocyanate having a benzene ring group;

(2) a polyol;

(d) a curing agent comprising:

(1) a benzene ring having a hindered diamine; and,

(2) a benzene ring having an unhindered diamine;

wherein the polyurethane prepolymer and curing agent are post-cured at [are selected such that] a post-cure temperature [for the golf ball is between] of about 72° F [and] to about 102°F, and a post-cure time for the golf ball is between about 8 to 16 hours wherein the core compression is preserved during the post-cure.